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FIG. 3 is a flow chart illustrating the method for selecting one longer term data storage media to be read from or written to, according to one aspect of the present invention.

DETAILED DESCRIPTION OF THE
PREFERRED EMBODIMENT

The present invention features a data storage media system and retrieved 10, FIG. 1, for storing and retrieving data storage media. The present invention includes a media storage cabinet 12 arranged in a plurality of rows or columns, each row or column including a plurality of storage locations for containing a corresponding plurality of data storage media.

In the exemplary embodiment, the data storage media storage cabinet 12 is a rectangular shaped cabinet including a plurality of rows 14 of closely spaced data storage media 16. The size of storage cabinet 12 should be selected to provide the smallest cabinet possible to house the requisite number of storage media which are desired to be stored in the storage cabinet 12.

Storage media may range from traditional magnetic tape in rolls or cassettes, to disks such as optical disks, CD ROM or rather similar media. Although the exemplary cabinet is illustrated as having a plurality of rows, another embodiment of the present invention contemplates the cabinet being divided into a plurality of columns. In addition, the present invention also contemplates a cabinet divided into both rows and columns, all without departing from the spirit of the present invention.

In accordance with the present invention, each row 14 includes a drive mechanism which allows each data storage media 16 contained within a row to be moved or shuffled so as to present a selected one data storage media proximate a retrieval region 18 in each row 14. A retrieval mechanism 20, in the exemplary embodiment, includes a retrieval device 22 including gripper elements 23 which are adapted to pick up a selected one longer term data storage media presented in a retrieval region 18 of a particular row 14.

Retrieval mechanism 20 includes appropriate drive mechanisms to allow retrieval device 22 to be moved vertically, along an axis indicated generally by arrow 24, parallel to the retrieval region 18 of storage cabinet 12. Such retrieval mechanisms including mechanical retrieval devices are well known in the art and include, for example, a mechanism disclosed in U.S. Pat. No. 4,907,889.

Retriever mechanism 22 further includes, in the preferred embodiment, an encoded indicia reader 25, such as a bar code reader, which is used to read encoded indicia, such as bar codes, placed on the exterior of the data storage media, in order to build, maintain, and verify the data storage media index table as will be explained further below.

The present system further includes a storage media controller 26, (explained in greater detail below) which is preferably implemented in software although a hardware implementation is considered within the scope of the present invention. The storage media controller 26 is responsive to commands 28 from a host computer or other similar data processing device, directing the storage system to retrieve a predetermined one data storage media to be written to or read from. The storage media controller 26 of the present invention interprets host commands 28 requesting access to a predetermined data storage media or requesting access to a predetermined file or record which is converted by the storage media controller 26 into a predetermined one data storage media 16 to be selected.

The storage media controller then provides motor control signals 30 to the appropriate media row transport mecha-

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nism 40 of a selected row 14, to provide the selected one data storage media 16 proximate the retrieval region 18 of the predetermined row 14.

Retriever mechanism control signals 30a are also provided to retriever mechanism 20, for retrieving the preselected data storage media 16, and for inserting the selected and retrieved data storage media into reader/writer mechanism 32. Reader/writer mechanism 32 includes a tape drive, cassette tape reader, or disk reader, all based upon the type of storage media used.

Once the selected data storage media 16 has been retrieved and inserted in the reader/writer mechanism 32, data from the selected data storage media 16 (in the case of a read operation) is provided to the storage media controller 26 over signal path 34, and subsequently to a coupled host computer or other data processing system. In the case of a write operation, data is written from the coupled host or data processing system to the storage media controller 26, through the read/write mechanism 32, and onto the selected data storage media 16.

In the preferred embodiment of the present invention, each row 14, FIG. 2, of data storage media cabinet 12 includes a plurality of closely spaced storage media storage locations 36 in which may be stored a corresponding plurality of data storage media 16. In the preferred embodiment, at least one data storage media storage location, such as location 36a, is left vacant or empty, thus allowing the shuffling or movement of the data storage media 16 within the row 14.

One empty or unused data storage media storage location is necessary to allow the data storage media 16 stored within a given row 40 to be moved or shuffled within the row. More than one empty or unused data storage media storage locations 36a can be provided to speed up the ability of the present system to provide the selected data storage media 16 to the retriever device 22. Thus, the number of unused or empty data storage media storage locations 36a can be adjusted to suit the access time requirements of a given user or site. The quicker the desired access time, the higher the number of empty or unused locations 36a.

Each row (or alternatively, each column) of the data storage media storage cabinet 12 includes a media transport mechanism 40 which, in the exemplary embodiment, includes a mechanism to move each storage media storage location 36 and accompanying data storage media 16 along at least two orthogonal axes within the plane of the row 14, as illustrated generally by arrows 42 and 44.

The media transport mechanism 40, for exemplary purposes, may include one or more precisely controllable D.C. stepper motors coupled to a lead screw. Other equivalent transport mechanisms are available as known in the art and are considered to be within the scope of the present invention.

Each transport mechanism 40 is coupled by one or more control signal paths 30 to the storage media controller 26. Upon receiving a request from a host or other similar data processing system 46 which needs to store and retrieve data (not part of the present invention), the host interface portion 47 of the storage media controller 26 decodes the received request, (read, write, or load storage media command, for example) to determine which operation the host or data processing device 46 wishes to perform on the data storage media 16. A central processing unit 48, under control of a software program as is well known in the art, which are part of the storage media controller 26, will determine, from a data storage media index or table 50, the exact present